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# Standard Operating Procedure

## Base Bath – Stratasys 3D print cleaner

### Section 1 – Lab-Specific Information

| | |
|---|---|
| **Department:** | College of Engineering – Discovery Learning Labs |
| **Date SOP was written:** | 10/29/2018 |
| **Date SOP was approved by PI/lab supervisor:** | Click here to enter a date. |
| **Principal Investigator:** | Thomas Silman |
| **Internal Lab Safety Coordinator/Lab Manager:** | Thomas Silman |
| **Lab Phone:** | 414-288-4602 |
| **Office Phone:** | 414-288-5423 |
| **Emergency Contact:** | Thomas Silman 414-350-5432 |
| **Location(s) covered by this SOP:** | *Engineering Hall – Discovery Learning Labs Complex* |

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## Section 2 – Type of SOP:

☐ Process ☒Hazardous Chemical ☐ Hazardous Class

## Section 3 – Physical / Chemical Properties and Uses

**Physical / Chemical Properties:**

CAS#: 1310-73-2

GHS Classification: Corrosive

Molecular Formula: Sodium hydroxide

Form (physical state): Dry Granular Solid

Color: White

Boiling Point: N/A

**Uses:**

Base baths are highly concentrated sodium hydroxide solutions used to 3D printed parts to remove support material after printing. The solutions consist of Water and Sodium hydroxide. The parts are cleaned by chemically dissolving the support plastic.

## Section 4 – Potential Hazards

The Base bath is corrosive. In animal studies, short-term exposure to sodium hydroxide has caused severe corrosive damage to the esophagus. Inhalation may cause irritation to the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. It is destructive to the tissue of the mucous membranes and upper respiratory tract. Contact with skin causes burns and irritation. Prolonged or repeated skin exposure may cause skin defatting or dermatitis. Eye contact causes burns, irritation, and may cause blindness. Ingestion may cause permanent damage to the digestive tract.

## Section 5 – Personal Protective Equipment (PPE)

**Respirator Protection:**

Not required unless exposure limits for Sodium Hydroxide are exceeded.

**Hand Protection:**

Gloves must be worn. Use proper glove removal technique to avoid any skin contact. Check the resources below for the most suitable glove.

**NOTE:** Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with the specific base bath solution being used.

Refer to glove selection chart from the links below:

http://www.ansellpro.com/download/Ansell_8thEditionChemicalResistanceGuide.pdf

OR

http://www.showabestglove.com/site/default.aspx

OR

http://www.mapaglove.com/

**Eye Protection:**

ANSI approved properly fitting safety glasses or chemical splash goggles are required. A face shield may also be necessary when there is a potential for splashes.

**Skin and Body Protection:**

Laboratory coats may be worn and be appropriately sized for the individual and buttoned to their full length. Laboratory coat sleeves must be of sufficient length to prevent skin exposure while wearing gloves. Personnel should also wear full length pants, or equivalent, and close-toed shoes. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle should not be exposed. Aprons may also be appropriate depending on the application.

**Hygiene Measures:**

Wash thoroughly and immediately after handling. Rinse immediately contaminated clothing and skin with plenty of water before removing clothes.

## Section 6 – Engineering Controls

Preparation and use of bath should be conducted in a properly ventilated room.

## Section 7 – First Aid Procedures

**If inhaled:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

**In case of skin contact:**

Remove contaminated clothing. Wash thoroughly with soap and water immediately. Get medical attention if irritation or burns develop.

**In case of eye contact:**

Check for and remove any contact lenses. Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Seek immediate medical attention.

**If swallowed:**

Do NOT induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. If victim is conscious and alert, rinse mouth out with water. Seek immediate medical attention.

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## Section 8 – Special Handling and Storage Requirements

- Sodium hydroxide is extremely corrosive.
- Avoid contact with skin and eyes. Wash thoroughly after handling.
- Remove contaminated clothing and wash before reuse.
- Never add water to sodium hydroxide, only add sodium hydroxide to water.
- Containers should be labeled appropriately. Label should indicate the name of the chemical(s) in the container. Avoid using chemical abbreviations (acceptable if a legend is present in the lab) and formulae.
- Keep container upright & closed in a dry and well-ventilated place.
- Keep away from incompatible materials such as acids and oxidizing materials
- Containers should remain closed when not in use.

## Section 9 – Spill and Accident Procedures

**Major Chemical Spill Dial 8-1911**

Immediately evacuate area and ensure others are aware of the spill. Evacuate personnel to a safe area. Keep personnel removed and upwind.

If the spill is minor and does not pose a threat to personnel, contact EH&S at 8-8411 during normal business hours (7:30 AM – 4:30 PM) for spill cleanup assistance if needed (dial 8-911 if spill occurs after hours and assistance is needed).

**Chemical Spill on Body or Clothes:**

Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes.

Seek medical attention; **dial 8-1911**.

**Chemical Splash into Eyes:**

Immediately rinse eyes and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention; **dial 911**.

## Section 10 – Medical Emergency

**Life Threatening Emergency, After Hours, Weekends And Holidays:**

**Dial 8-1911**

**Non-Life Threatening Emergency**:

Immediately report injury to supervisor and complete the First Report of Injury.

http://www.marquette.edu/riskunit/riskmanagement/documents/Employee_First_Report_of_Incident.pdf

## Section 11 – Waste Disposal Procedures

**Label Waste:**

Base solutions can be disposed of down the drain by dilution. Do not mix base bath solutions with acidic waste streams. After the base bath has lost its cleaning effectiveness, drain the bath to associated sink and dilute the bath using water. The soluble solution has been specially formulated to be safely disposed after dilution and neutralization to an acceptable pH level. The pH level of fresh solution is like that of typical laundry detergents, dishwasher detergents, and common household cleaners. Dilution of 5 parts water to 1 part bath is recommended. If necessary, the soluble solution can be further neutralized to lower the pH level by slowly adding acid (e.g., malic acid) to the tank before draining.

**Store Waste**:

Not applicable

**Dispose of Waste:**

Not applicable

## Section 12 – Safety Data Sheet (SDS)

A current copy of the SDS for the base bath solution is being used must be made available to all personnel working in the laboratory at all times. https://cispro.mu.edu/

To obtain a copy of the SDS, refer to Marquette's SDS library under WaterWorks concentrate.

http://www.marquette.edu/riskunit/environmental/documents/msds_library.pdf or contact the chemical manufacturer. Many manufacturers' SDSs can be found online on websites such as Sigma-Aldrich (http://www.sigmaaldrich.com/united-states.html) or Siri MSDS Index (http://hazard.com/msds/).

## Section 13 – Protocol/Procedure (Additional lab protocol may be added here)

Not applicable

**NOTE:** Any deviation from this SOP requires approval from PI.

## Section 14 – Documentation of Training (signature of all users is required)

- Prior to conducting any work with a base bath, designated personnel must be trained by other laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the SDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training within the last one year.

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**I have read and understand the content of this SOP:**

| Name | Signature | Date |
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